Listing of Claims:

1. (Amended, First) A method of measuring a curvature of a subsurface borehole having a surrounding wall comprising locating in the borehole an elongate structure having mounted thereon at least three distance sensors spaced apart longitudinally of the borehole, each distance sensor being adapted to produce an output signal corresponding to a distance between that sensor and the surrounding wall of the borehole, and processing said signals to determine the curvature of the borehole in the vicinity of the sensors further comprising means for sensing deflections in the elongate structure, said means generating signals which are processed with the signals from the distance sensors in a manner to correct for such deflections when determining the curvature of the borehole.

2. (Original) A method according to Claim 1, wherein the sensors are equally spaced apart.

3. (Original) A method according to Claim 1, wherein the sensors are unequally spaced apart.

4. (Original) A method according to Claim 1, wherein the sensors lie along a line extending substantially parallel to an axis of the elongate structure, so as to be located in the same angular position as one another with respect to the axis.

5. (Original) A method according to Claim 1, further including a step of rotating the elongate structure about an axis extending longitudinally of the borehole and processing the signals from the sensors, said signals being processed as a function of the rotational position of the structure to determine the curvature of the borehole in a plurality of different planes containing said rotational axis.

6. (Original) A method according to Claim 5, wherein the signals from the sensors are processed at a plurality of different rotational positions of the structure.

7. (Original) A method according to Claim 5, wherein the signals from the sensors are processed continuously.

8. (Original) A method according to Claim 1, wherein the method further comprises the steps of determining at least the lateral curvature, and the curvature in a vertical plane, of the borehole.

9. (Original) A method according to Claim 1, wherein the sensors include at least one non-contact sensor which emits a signal towards the wall of the borehole, receives the signal reflected from the wall of the borehole and generates an output signal dependent on the time taken between emission and reception of the signal, and hence on the distance of the sensor from the wall of the borehole.

10. (Original) A method according to Claim 9, wherein said sensor is one of an acoustic, a sonic and an ultra-sonic sensor.

11. (Original) A method according to Claim 1, wherein the sensors include a mechanical probe projecting from the elongate structure and contacting the wall of the borehole, the sensor being adapted to generate an output signal dependent on the attitude or condition of the probe as affected by the distance of the elongate structure from the wall of the borehole.

12 (Withdrawn)

13. (Amended, first) A method according to Claim ~~13~~ 1, wherein the deflection sensing means comprises strain gauges adapted to sense differential elongation of different regions of the elongate structure, from which deflections of the structure may be determined.

14. (Original) A method according to Claim 1, wherein the elongate structure on which the distance sensors are mounted is so mounted on another elongate downhole component as to be isolated from deflections of said downhole component.

15. (Original) A method according to Claim 14, wherein the elongate structure is mounted on the downhole component by a number of supports such that deflections of the downhole component are not transmitted by the supports to the elongate structure.

16. (Original) A method according to Claim 15, wherein said supports comprise connecting elements of low modulus of elasticity.

17. (Original) A method of controlling directional drilling equipment including a downhole drilling assembly incorporating a bias unit which is responsive to an input bias signal in a manner to control the direction of drilling in accordance with the bias signal, the method comprising producing the bias signal by measuring the curvature of the borehole, and comparing the measured curvature with a desired curvature, and sending to the bias unit bias signals to reduce or minimize the different between the measured and desired curvatures of the borehole.

18. (Original) A method according to Claim 17, wherein a curvature of the borehole is measured by locating in the borehole an elongate structure having mounted thereon at least three distance sensors spaced apart longitudinally of the borehole, each distance sensor being adapted to produce an output signal corresponding to a distance between that sensor and the surrounding wall of the borehole, and processing said signals to determine the curvature of the borehole in the vicinity of the sensors.

19. (Amended, first) An apparatus for use in measuring a curvature of a subsurface borehole comprising an elongate structure having mounted thereon at least three distance sensors spaced apart longitudinally of the borehole, in use, each distance sensor being adapted to produce an output signal corresponding to a distance between that sensor and the surrounding wall of the borehole and further comprising means for sensing deflections in the elongate structure.

20. (Original) An apparatus according to Claim 19, wherein the sensors are equally spaced apart.

21. (Original) An apparatus according to Claim 19, wherein the sensors are unequally spaced apart.

22 (Original) An apparatus according to Claim 19, wherein the sensors lie along a line extending substantially parallel to an axis of the elongate structure, so as to be located in the same angular position with respect to the axis.

23. (Original) An apparatus according to Claim 19, wherein the sensors include at least one non-contact sensor which emits a signal towards the wall of the borehole, receives the signal reflected from the wall of the borehole and generates an output signal dependent on the time taken between emission and reception of the signal, and hence on the distance of the sensor from the wall of the borehole.

24. (Original) An apparatus according to Claim 23, wherein said sensor comprises one of an acoustic, a sonic and an ultra-sonic sensor.

25. (Original) An apparatus according to Claim 19, wherein the sensors include a contact sensor having a mechanical probe projecting from the elongate structure and contacting the wall of the borehole, the sensor being adapted to generate an output signal dependent on the attitude or condition of the probe as affected by the distance of the elongate structure from the wall of the borehole.

26. (Withdrawn)

27. (Amended, first) An apparatus according to Claim ~~26~~ 19, wherein said deflection sensing means comprises strain gauges adapted to sense differential elongation of different regions of the elongate structure, from which deflections of the structure may be determined.

28. (Original) An apparatus according to Claim 19, wherein the elongate structure on which the distance sensors are mounted is so mounted on another elongate downhole component as to be isolated from deflections of said downhole component.

29. (Original) A method of measuring a curvature of a subsurface borehole having a surrounding wall comprising locating in the borehole a rotating elongate structure having mounted thereon at least one magnet, a roll stabilized control unit within the elongate structure adapted to produce an output signal corresponding to a distance between the control unit and the magnet, and processing said signals to determine the curvature of the borehole in the vicinity of the sensors.

30. (Original) A method according to Claim 29, wherein a plurality of magnets are diametrically mounted on the elongate structure.

31. (Original) A method according to Claim 30, wherein the magnets are equally spaced apart.

32. (Original) A method according to Claim 30, wherein the magnets are unequally spaced apart.

33. (Original) A method according to Claim 30, wherein the magnets lie along a line extending substantially parallel to an axis of the elongate structure, so as to be located in the same angular position as one another with respect to the axis.

34. (Original) An apparatus for use in measuring a curvature of a subsurface borehole comprising an elongate structure having mounted thereon at least one magnet, a roll stabilized control unit within the elongate structure adapted to produce an output signal corresponding to a distance between the control unit and the magnet, in use, the control unit being adapted to produce an output signal corresponding to a distance between that sensor and the surrounding wall of the borehole.

35. (Original) An apparatus according to Claim 34, wherein a plurality of magnets are diametrically mounted on the elongate structure.

36. (Original) An apparatus according to Claim 35, wherein the magnets are equally spaced apart.

37. (Original) An apparatus according to Claim 35, wherein the magnets are unequally spaced apart.

38. (Original) An apparatus according to Claim 35, wherein the magnets lie along a line extending substantially parallel to an axis of the elongate structure, so as to be located in the same angular position with respect to the axis.

Drawings

New corrected drawings are enclosed and are believed to overcome the examiner's objection.